

What is claimed is:

1. A method for removing radionuclides adhered to the surface of at least one of stainless steel or aluminum material, the method comprising the steps of:

a) contacting the material with a carbonate/bicarbonate electrolyte solution having a pH of about 4, the electrolyte solution containing at least one of sodium or potassium ions; and

b) electrolytically removing the radionuclides from the surface of the metal whereby radionuclides are caused to be stripped off of the material without corrosion or etching to the material surface.

2. The method for removing radionuclides, as defined in claim 1, wherein the carbonate concentration is about 2% by weight of the bicarbonate.

3. The method for removing radionuclides, as defined in claim 1, wherein the radionuclides are selected from the group consisting of cesium, strontium and actinides.

4. A method for reclaiming radiation contaminated equipment constructed from at least one of stainless steel or aluminum material, the method comprising the steps of:

- a) providing an electrolytic treatment vessel, the treatment vessel including a cathode and an electric current power supply for supplying DC current thereto;
- b) providing an electrolytic solution within the treatment vessel, the electrolytic solution comprising a carbonate/bicarbonate solution having a pH of about 4 and containing at least one of sodium or potassium ions;
- c) positioning equipment to be reclaimed in the tank and connecting the equipment to the power supply;
- d) selectively applying a DC current between the cathode and the equipment for a period of time sufficient to cause electrolytic removal of radionuclides from the surface of the equipment whereby radionuclides are stripped off of the equipment without corrosion or etching to the surface of the equipment;
- e) washing the equipment following electrolysis; and
- f) recovering the electrolytic solution for further treatment.

5. The method for reclaiming radiation contaminated equipment, as defined in claim 4, further including the step of distilling the recovered solution to separate the water from the stripped radionuclides.

6. The method for reclaiming radiation contaminated equipment, as defined in claim 4, wherein the carbonate concentration is about 2% by weight of the bicarbonate.

7. The method for reclaiming radiation contaminated equipment, as defined in claim 4, wherein the radionuclides are selected from the group consisting of cesium, strontium and actinides.